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APPLICATION NO.	F	ILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO	
10/634,141	08/04/2003		Ilya V. Karpov	ITO.0554US (P16589)	5089	
21906	7590	12/27/2005		EXAM	EXAMINER	
TROP PRU	JNER &	HU, PC		LEE, EU	JGENE	
8554 KATY	FREEWA	ΑY				
SUITE 100				ART UNIT	PAPER NUMBER	
HOUSTON, TX 77024			2815			
				DATE MAILED: 12/27/200	5	

Please find below and/or attached an Office communication concerning this application or proceeding.

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		Application No.	Applicant(s)					
	Office Action Comments	10/634,141	KARPOV, ILYA V.					
	Office Action Summary	Examiner	Art Unit					
		Eugene Lee	2815					
Period fo	The MAILING DATE of this communication app or Reply	pears on the cover sheet with the c	orrespondence address					
WHIC - Exter after - If NO - Failu Any	ORTENED STATUTORY PERIOD FOR REPL' CHEVER IS LONGER, FROM THE MAILING Donsions of time may be available under the provisions of 37 CFR 1.1 SIX (6) MONTHS from the mailing date of this communication. The period for reply is specified above, the maximum statutory period or to reply within the set or extended period for reply will, by statute reply received by the Office later than three months after the mailing and patent term adjustment. See 37 CFR 1.704(b).	ATE OF THIS COMMUNICATION 36(a). In no event, however, may a reply be tim will apply and will expire SIX (6) MONTHS from to cause the application to become ABANDONE	the mailing date of this communication.  D (35 U.S.C. § 133).					
Status								
1)	Responsive to communication(s) filed on <u>03 O</u>	ctober 2005.						
,		action is non-final.						
3)	Since this application is in condition for allowa	nce except for formal matters, pro	secution as to the merits is					
	closed in accordance with the practice under E							
Dispositi	on of Claims							
4)⊠	☑ Claim(s) <u>1,4,8,10 and 32-37</u> is/are pending in the application.							
	4a) Of the above claim(s) is/are withdrawn from consideration.							
5)	Claim(s) is/are allowed.							
6)⊠	Claim(s) <u>1,4,8,10,32-37</u> is/are rejected.							
7)	Claim(s) is/are objected to.							
8)□	Claim(s) are subject to restriction and/o	r election requirement.						
Applicati	ion Papers							
9)[	The specification is objected to by the Examine	er.						
10) The drawing(s) filed on is/are: a) accepted or b) objected to by the Examiner.								
	Applicant may not request that any objection to the							
	Replacement drawing sheet(s) including the correct	tion is required if the drawing(s) is ob	jected to. See 37 CFR 1.121(d).					
11)[	The oath or declaration is objected to by the Ex	xaminer. Note the attached Office	Action or form PTO-152.					
Priority (	under 35 U.S.C. § 119							
а)	Acknowledgment is made of a claim for foreign  All b) Some * c) None of:  1. Certified copies of the priority document  2. Certified copies of the priority document  3. Copies of the certified copies of the priority document  application from the International Burea  See the attached detailed Office action for a list	ts have been received. ts have been received in Applicati rity documents have been receive u (PCT Rule 17.2(a)).	ion No ed in this National Stage					
2) Notice 3) Infor	nt(s)  Dee of References Cited (PTO-892)  Dee of Draftsperson's Patent Drawing Review (PTO-948)  The mation Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  The results of the second s	4)  Interview Summary Paper No(s)/Mail D  5)  Notice of Informal F 6) Other:						

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### **DETAILED ACTION**

# Claim Objections

1. Claim 10 is objected to because of the following informalities: claim 10 is dependent on a cancelled claim. Appropriate correction is required.

# Claim Rejections - 35 USC § 112

- 2. The following is a quotation of the second paragraph of 35 U.S.C. 112:
  - The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
- 3. Claims 32 thru 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "sublithographic" is a relative term that renders the claim indefinite. The term "sublithographic" is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and, therefore, one of ordinary skill in the art at the time of invention would not be reasonably apprised of the scope of the invention. The metes and bounds of the term "sublithographic" are unclear, and not known how "small" a pore or otherwise has to be to be categorized as "sublithographic". Appropriate clarification and/or correction are required.

### Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Insofar as definite, claims 1, 4, 8, 10, and 32 thru 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang 6,545,287 B2 in view of Harshfield 6,117,720 in view of Hudgens et al. 6,507,061 B1. Chiang discloses (see, for example, FIG. 7) a phase-change memory cell comprising a pore 31, insulating layer (insulator) 14, sidewall spacer 24, heater 22, and phase change material 18. Chiang does not disclose removing the upper portion of said heater to form a gap. However, Harshfield discloses (see, for example, FIG. 4 and 5) a memory cell comprising the steps of removing a plug 61 below at top surface 56. In column 4, lines 36-44, Harshfield discloses the plug is recessed below the top surface to form the base portion (heater) 42 and leave free the upper cavity portion 54. In FIG. 6, a chalcogenide material (phase change material) 45 is inserted into the upper cavity. It would have been obvious to one of ordinary skill in the art at the time of invention to remove the upper portion of said heater to form a gap in order to form a free cavity wherein a phase change material may be adequately deposited.

Chiang in view of Harshfield does not disclose patterning and etching said phase change material over said insulator. However, Hudgens discloses (see, for example, FIG. 1) a phase-change memory comprising a phase change material 22. In column 3, lines 25-27, Hudgens discloses the patterning and etching of the phase change material to form the phase-change memory. It would have been obvious to one of ordinary skill in the art at the time of invention to pattern and etch said phase change material over said insulator in order to remove any excess material in the phase change memory.

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Regarding claim 4, see, for example, column 4, lines 28-33 wherein Harshfield discloses any excess material above the top surface 56 of dielectric volume 50 is removed by a mechanical planarization. It would have been obvious to one of ordinary skill in the art at the time of invention to planarize the upper surface of said insulator in order to keep the insulating layer flat and without any structural defects.

Regarding claim 8, see, for example, FIG. 7 wherein Chiang discloses the phase change material having a T-shape.

Regarding claim 10, see, for example, column 3, lines 53-55 wherein Chiang discloses the heater 22 being made of titanium nitride (metal). Chiang discloses (see, for example, FIG. 4, and 5) that the titanium nitride is deposited in the pore after forming the spacer 24.

#### Response to Arguments

Applicant's arguments with respect to claims 1, 4, 8, 10, and 32-37 have been considered but are most in view of the new ground(s) of rejection.

Regarding the applicant's argument on page 4 of the reply filed 10/3/05, Chiang clearly discloses (see, for example, FIG. 5) a procedure wherein the heater 30 is formed with the spacer 24. Whether Harshfield explicitly teaches away from such a procedure is not pertinent since Chiang already discloses the heater being formed with the spacer, and the removal of the heater in Harshfield is not dependent on whether the spacer is present or not. The removal of the heater can clearly be done with or without the spacer by etching (see, for example, column 4, lines 38-40 of Harshfield). Therefore, that procedure, as disclosed by Harshfield, may be applied to Chiang.

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Regarding the limitation "sublithographic", the term is not defined by the specification, and, therefore, it is not clear how small (i.e. ranges, specific sizes) the pore may be to still be classified as having "sublithographic" dimensions.

#### Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

## INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee December 12, 2005

SOE Kenneth Parker